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CARE OF FOOD IN THE HOME.

[Corrected to March 25, 1910.]

BY

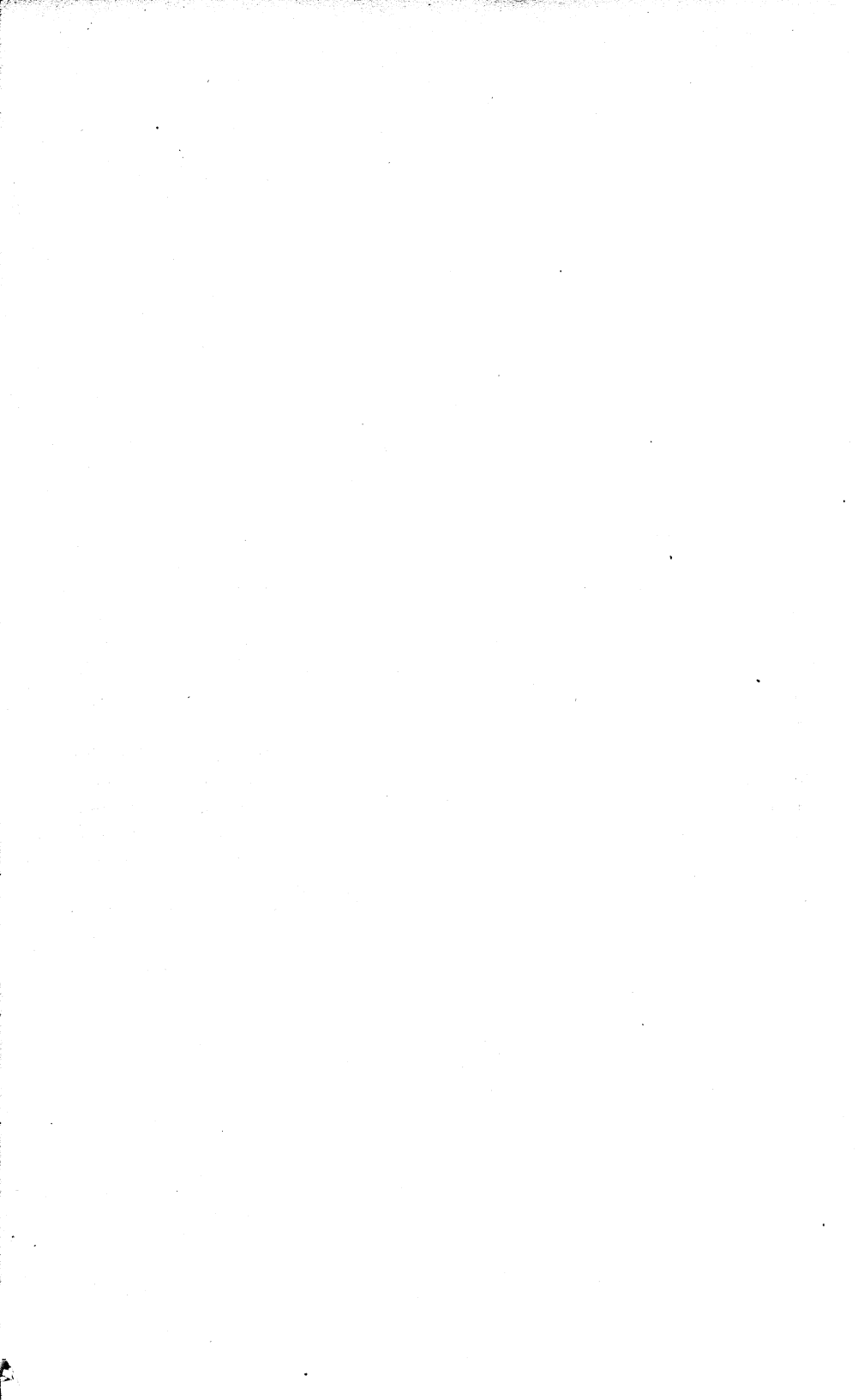
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PREPARED UNDER THE SUPERVISION OF THE OFFICE OF EXPERIMENT STATIONS

A. C. TRUE, Director.



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., April 14, 1909.

SIR: I have the honor to transmit herewith, and recommend for publication as a Farmers' Bulletin, an article on household methods of handling and storing food, by Mrs. Mary Hinman Abel.

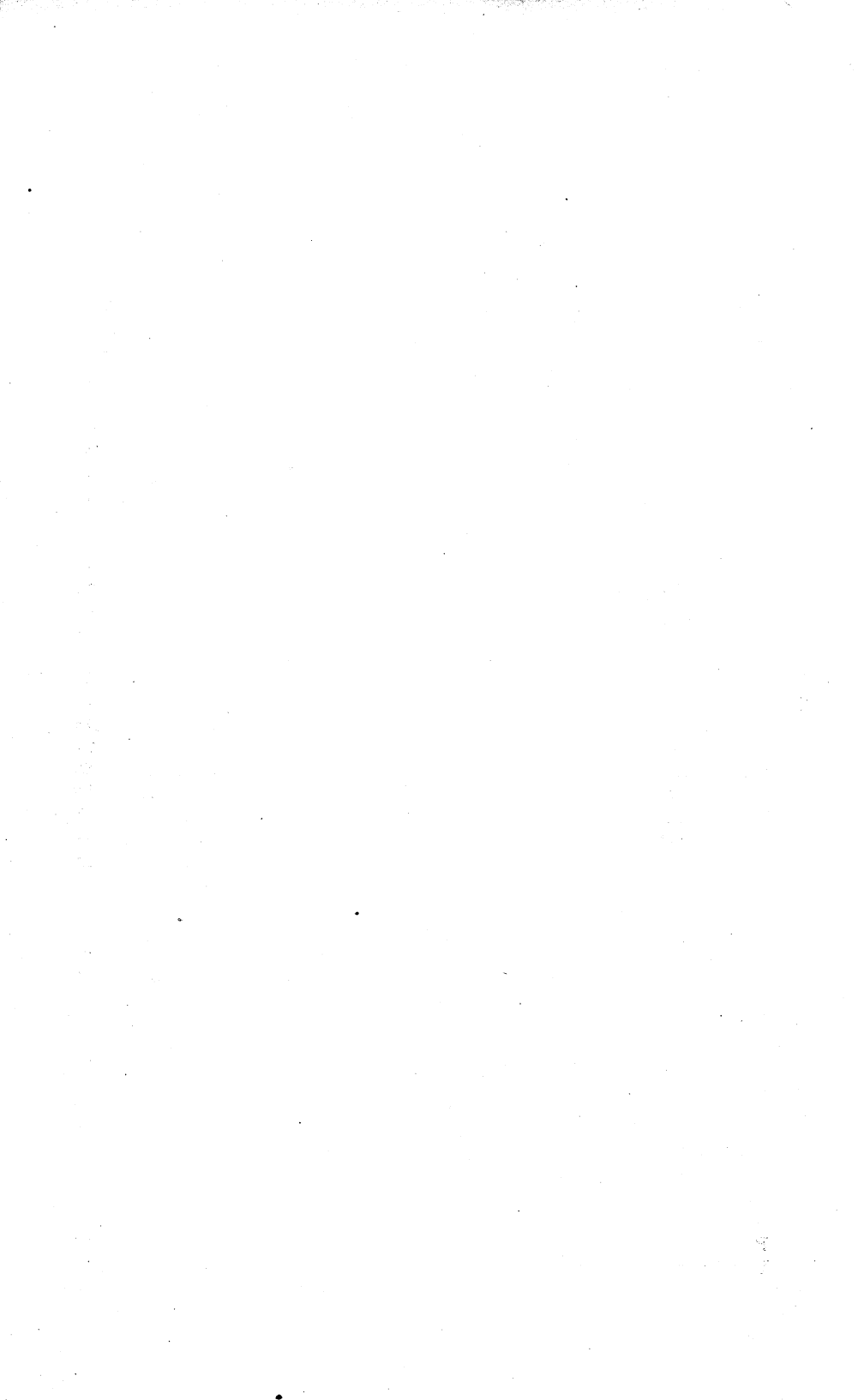
In this bulletin Mrs. Abel has summarized the results of experiments and tests specially undertaken for it, as well as experience obtained in the practical handling of such problems. The information thus collected has been supplemented by general data gathered from the publications of the agricultural experiment stations, agricultural colleges, reports of state boards of health, government documents, and other sources of information.

The questions considered have to do with the economical use in the home of the products of the farm, dairy, and garden, and also with the subject of household hygiene. These are subjects of interest to the housekeeper in both rural regions and town, and the bulletin has been prepared with a view to meeting the numerous requests received at the Department of Agriculture for information along such lines.

Respectfully,

A. C. TRUE,
Director.

Hon. JAMES WILSON,
Secretary of Agriculture.



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CARE OF FOOD IN THE HOME.

INTRODUCTION.

The woman who presides over a household should consider as one of her most important functions the purchase of food and its storage preliminary to use in the kitchen. Should she be living on a farm she will buy less in amount than the woman who lives in the town or city, but, on the other hand, the storage of food will demand more of her attention. In both cases, if intelligence and care are lacking, financial loss will ensue and the family table will be less attractive and wholesome than it should be.

Most families have traditions and well-established customs to guide them in the handling and storing of foods, but since the customs of one family may differ widely from those of another, it is well to examine and compare them in order to select the best. Scientific investigation has also thrown light on many of the processes concerned and the result of such labors should be at the service of the householder. The health and efficiency of the family is the chief object of her care, and it is an end well worth the effort.

YEASTS, MOLDS, AND BACTERIA, AND THE SPOILING OF FOOD.

In the buying, storing, and handling of food it is most important that we realize the causes of what is called the "spoilage" of food. This knowledge is comparatively recent.

THE NATURE OF YEASTS, MOLDS, AND BACTERIA.

Countless numbers of tiny living things called micro-organisms, a word meaning simply "small living things," are everywhere found which will grow in the food man has prepared for his own use and cause it to spoil. Indeed, the kind of food required by man and animals seems to be that which is also best suited to these microscopic plants.

It is this very demand for highly organized food which brings them into such close relation to all problems that concern the food of man. These microscopic plants flourish in the kitchen, storeroom, ice box,

milk room, and cellar. If the conditions are favorable they reproduce themselves with incredible rapidity, one bacterium in the course of a day producing a million more minute plants like itself. The bulk of these minute forms of life are harmless, at least under usual conditions; some are useful, like those which ripen milk; and many are harmful, since they cause waste or may be, what is much more serious, a direct cause of disease.

Molds, yeasts, and bacteria may be found in the cleanest room, but they exist in far greater numbers in dirty quarters, where, for instance, crumbs of food have been allowed to decay and dust to accumulate. Not only do the micro-organisms appropriate our food, with the result that the food sours, rots, or putrefies, but they sometimes, in addition, leave behind disagreeable consequences like the musty and moldy odor and flavor of some spoiled foods, or the substances called ptomaines, which are sometimes poisonous. The housekeeper's success in preserving food from deterioration depends very largely on her ability to reduce the number of these unbidden guests to the lowest possible limit.

The science of bacteriology has given us a new meaning for the scrubbing, airing, and sunning that for many generations good housekeepers have successfully practiced; it shows us that the storing and handling of foods are essentially bacteriological questions, and on that account some knowledge of the nature of these microscopic plants is here in order.

YEASTS AND THEIR UTILIZATION.

Not until millions of yeast cells are massed together do they become visible to the eye as in the compressed yeast cake. Yeast plants are practically everywhere and are of many varieties, some being called "wild yeasts," in distinction from those we have learned to cultivate for the making of bread and brewing of beer, and the fermentation of wine and cider. The old-fashioned method of making "milk-rising" or "salt-rising" bread depended on wild yeast falling into the dough and causing the bread to rise, a method not always successful, because other organisms, the bacteria, also had a chance at the dough and sometimes got the better of the yeast in the struggle for food, and the result of their life in the dough was sour or bitter bread.

Even when we are able to utilize the life processes of the yeast plant, its good offices are paid for with a certain amount of food material; thus, when introduced into the bread dough it breaks up part of the sugar present into alcohol and carbonic-acid gas, and the gas becomes tangled and stretches out in the glutenous mass, making the porous loaf which at the right moment is stiffened by the heat of the oven.

In the same way the wild yeast attacks the sugar in the stewed fruit that has stood exposed on a warm day, or the jelly left uncovered, or sometimes even when apparently covered, only in these cases the gas evolved serves no useful purpose and the fermentation ruins the taste of the food.

Yeasts grow best at a temperature of 70 to 90° F.; therefore, food that is to be protected from their action must be kept well below this point.

MOLDS AND THEIR PREVENTION.

The appearance of mold as growing on bread, cheese, and other foods is familiar to every housewife; mildew on cloth is a less commonly recognized form of mold.

The spores (i. e., the minute reproductive bodies) of the different varieties of mold are everywhere present, and they need only warmth and moisture to enable them to grow on many kinds of food. These organisms are always at work in damp cellars and in dark and damp corners of rooms; they are borne on the feet of insects, they are on the skins of all fruits, and in the dust flying in the air. They are not fond of light and they require no great abundance of air, flourishing best in foods that are piled close together, leaving small undisturbed air spaces and moisture. They always start on the surface and throw their thread-like filaments down into the substance below. Take, for example, a fine ripe apple and closely examine the skin. If it is in good condition and attractive it is almost certain that the flesh is protected in the natural way by an unbroken skin which resists the entrance of molds and other micro-organisms. If, however, the apple has begun to spoil, it is almost certain that the skin has been broken.

When fruits touch each other, the point of contact is likely to be moister than the rest of the fruit, and for this and other reasons it is a favorite place for the starting of mold or other growth. If the skin is perfectly firm and we rub it with a clean cloth to dry it and to remove as many as possible of the mold germs, then wrap the apple in soft paper and put it in a cold place, precautions have been taken which should hinder or prevent decay. If, however, the fruit is kept in a warm and damp place, and touching other fruits, its decay is certain. In dealing with all varieties of microscopic life we have learned that to prevent them from getting a start is the all-important thing. The growth, once begun, is difficult to arrest.

The first requisite is absolute cleanliness in the storage place. This is not to be attained by the use of soap and water alone. Fresh air, sunshine, and whitewash are important aids. Shelves should be washed clean and then dried; but the undue use of water should be avoided, as moisture is one of the chief requisites of growth. A

cellar may be kept dry by placing in it dishes of unslaked lime, which takes up the moisture with avidity. When the lime crumbles apart, losing entirely its crystalline character, it has become "slaked," will take up no more water, and must be renewed.

The growth of most molds is retarded by light, ventilation, and low temperature. Light and ventilation are important. The right degree of cold for each different product has been studied experimentally, and a knowledge of low temperature in relation to the growth of bacteria and fungi forms the basis of the cold-storage industry.

BACTERIA AND HOW TO CONTROL THEM.

From the standpoint of household sanitation bacteria are by far the most important of the three groups of micro-organisms under consideration. They are many times smaller than the yeasts, and their power of reproduction is almost unlimited. They require at least 25 per cent of moisture in which to live and multiply, and they prefer darkness to light, and while as a class they grow best at a comparatively high temperature, 80 to 95° F., most of them are killed by an exposure to 150–160° F. of moist heat. A repeated application of boiling temperature is necessary, however, to kill the spores which certain kinds produce.

Bacteria are very widely distributed; the soil teems with them; they are in the air, in water, and in all food exposed to dust and air, milk being a favorite habitat. The flesh of healthy living animals is free from them, but when slaughtered and marketed the surface is almost certain to acquire bacteria, like all things which are exposed to air and dust. They are inside the human body, often performing important functions, as in intestinal digestion. In short, wherever organic material is exposed to their inroads there they are found.

It is said that the numbers of bacteria are in direct relation to density of population. We can not get away from them without going into the highest mountains or to the polar regions; but we can protect our food supply from their undue growth by reversing all the conditions that they require for their development.

It is of primary importance that bacteria be prevented from getting their start. Hence, only such foods should be bought as are in the freshest and best possible condition. Since succulent fruits, milk, raw meat, and meat products are especially subject to bacterial action, they must be given unusual attention. They should be consumed as soon as possible after purchase or subjected to the following conditions: Utensils that come in contact with them must be thoroughly

scalded, or better, boiled. The hands and clothing of the worker must be kept clean and every effort made to avoid contact with dirt. Of cooked foods, moist vegetables, cooked fruits, moist made dishes like meat pies and similar dishes are particularly liable to "spoil" or "sour," and the importance of clean utensils, of keeping the foods protected from dust, etc., can not be too often pointed out.

The temperature at which food is kept should be reduced to that best suited to it, which is usually as near the freezing point as possible. Highly putrescible food, as meat, is thus kept for months in cold storage, and a good ice box will keep such food for days in perfect condition. Cool clean storage is as important for many cooked foods as for raw.

Since the water content of food must be above 25 per cent before bacterial life is possible in it, we may preserve food by drying it. This method, often in combination with salting and smoking, is applied to fish, meat, vegetables, and fruit.

By exposing food to 150-160° F. of heat for half an hour all varieties of bacteria would be killed except a few that are very resistant to heat. In the case of spore-forming bacteria the spores would in certain cases resist this degree of heat. The pasteurization of milk offers a familiar example of a food that is kept from spoiling by this method.

After thorough boiling food may be sealed from the outer air by the well-known method of canning.

Most varieties of bacteria are killed in a few hours by direct sunshine, but it must be direct. The recesses of a dark room are little affected by what sunshine may filter into its depths. Contents of storerooms should now and then be sunned, and such rooms should be regularly aired.

We may often make use of substances that inhibit bacterial growth. These tiny organisms can not live in a very heavy sugar solution, a fact made use of in preserving fruits. Vinegar, spices, salt, and wood smoke have a like effect, and their use is familiar in pickled and spiced vegetables and fruits and in salted and smoked meats.

PTOMAIN POISONING.

In some foods bacteria in the early stages of their action leave no disagreeable or unhealthful effects, so far as yet proved. Meat is in some measure ripened by bacterial action, and the "gamey" taste given meat by "hanging" comes in part from the same cause, though in both cases the changes are chiefly due to the action of ferments normally present.

It is not easy to draw the line between the harmless ripening processes and the bacterial changes classed as decay, but if the bacteria are allowed to grow without hindrance the time comes when

the food, either animal or vegetable, attacked by bacteria breaks up into a loathsome mass.

The food may become dangerous even before it shows outward signs of decomposition, for the bacteria may, as they feed upon the proteids, give off substances known as ptomaines, hardly to be recognized without laboratory apparatus, but some of which are very poisonous to man. Certain apparently mysterious cases of illness have been traced to such causes, and milk, fish, meat, cheese, baked beans, ice cream, and other foods have all been found responsible for "food poisoning." It is no uncommon thing to hear that a large number of the persons attending a banquet were taken violently ill within a few hours after, all with very similar symptoms. In some cases the illness has been of brief duration, in others it has continued for days, or even resulted in death. In one instance the offending food may have been lobster salad, in another, cold-storage chicken, in still another, ice cream. These severe cases of wholesale poisoning generally occur in the summer and after a very heated term. Doubtless many milder cases, called summer complaint, are due to the same cause. This sort of poisoning is not a true bacterial disease; that is, it is not due, as is typhoid fever, to the growth of an organism in the body, but the illness results from the introduction into the system of poisonous substances already formed in the food by the bacteria.

It is not known under what conditions these peculiar poisons are developed in foods; we know only that they are the result of bacterial action not so advanced as to give warning to the senses. It is a safe rule to eat very sparingly of foods which are liable to such changes in hot weather, and especially where the methods of preparation are not known or where the serving of a large number of people at the same time brings an undue strain on the culinary forces, in which case material is certain to be served which has been prepared a considerable time in advance and not properly cooled and stored.

DISEASE "GERMS" AND POLLUTED WATER.

The so-called "germs" of typhoid fever, diphtheria, and tuberculosis are bacteria, and as they may be conveyed by means of water or food this danger is a very real and serious one.

As a proof that contaminated water is the direct or indirect source of typhoid-fever infection it may be mentioned that the statistics of 10 large European cities whose water supply is drawn from pure mountain lakes and streams showed in 1905 a death rate very much lower than that of a large number of American cities whose average death rate from typhoid fever was 34 per 100,000 inhabitants.^a

^a Jour. New England Waterworkers' Assoc., 19 (1905), No. 4, p. 575.

The germs of typhoid fever, like those of cholera, are voided in the feces and urine of the patient. Because of carelessness or ignorance in the disposal of these excreta they find their way into surface drainage, reach brooks and streams, and defile wells. Such infected water used as a beverage may readily cause typhoid. By means of milk cans washed in such water, or by the hands and clothing of persons who have nursed typhoid patients, the germs are planted in milk, and in this nutritive medium they develop with wonderful rapidity, so that milk becomes, next to water, the great carrier of typhoid. It is also known to have carried diphtheria and scarlet fever and it has well been called the most valuable and the most dangerous food. The relation of flies and dust to typhoid and other diseases is discussed later (see pp. 14 and 17).

For protection from a polluted water and milk supply we must look chiefly to sanitary laws and their rigid enforcement. In such laws the housekeeper who is seeking to guard the health of her family has, or should have, the most lively interest. She should understand them herself, report any cases of disobedience that may come to her notice, and be willing to work for the passage of better laws if they are needed.

If the water supply is not known to be well guarded from pollution the existence of a disease like typhoid fever in any locality requires that the greatest precautions must be taken in every house. The drinking water must be boiled to destroy any disease-producing bacteria possibly contained in it, and this boiled water must be used for cleaning the teeth, for washing such vegetables and fruits as are consumed raw, and also in rinsing dishes and cooking utensils.

The tubercle bacillus, the cause of tuberculosis, should also be guarded against, though it is not likely to be carried by city water. Food may become infected with it from contact with a person suffering from the disease, and it is not unreasonable to forbid any such to aid in preparing meals. It is also a reasonable measure to prohibit the sale of milk from a farm where the disease is known to exist.

THE NECESSITY OF CAUTION IN THE USE OF RAW FOODS.

The numerous cautions suggested in this bulletin may seem unnecessary, but a few facts will show that they are not extreme.

In older civilizations, where the soil has been exhausted and needs constant manuring, cooked fruit and vegetables rather than raw are much more the rule than with us. In densely peopled China, where night soil is used to fertilize the land, the eating of raw vegetables is said to be very rare. It is easy to see why such foods uncooked might be very dangerous. Although such methods are not followed to any great extent in the United States, raw fruits and vegetables may be a menace to health. Methods of washing fruits and vegetables are discussed in another section.

A Russian authority, Professor Metchnikoff,^a because of the possible presence of disease micro-organisms and minute animal pests, as intestinal worms, strongly advises against the eating of any raw food whatever, even if it has been washed in boiled water. Although this view may be considered extreme for American conditions, it shows what care must be taken in the purchase and the cleaning of food that is to be consumed raw.

Kitchen methods in many of their details fail to meet the requirements of sanitary science. The cook is not trained in bacteriology; she does not know what cleanliness means from the laboratory point of view. The old-fashioned hatred of dirt for its own loathsome sake is the best substitute for this knowledge, but it is not enough. For instance, boiling has long been known to kill whatever was the cause of "spoiling" of food. However, most housekeepers did not "boil out" the milk pans, etc., but simply scalded them. "Scalding" is an indefinite term; if boiling hot water is used, and enough of it, scalding would doubtless be effective, but too often when the facts in the case are not thoroughly understood such a process is carelessly carried out and the desired end is not accomplished. When in such cases the milk spoils very quickly it is often attributed to the weather or to bad luck. The housekeeper who understands the causes of spoiling, and who knows that the microscopic plants responsible for it may be destroyed by a sufficient degree of heat applied for the proper time, is much more likely to be successful than one who works by rule of thumb. Here, as in so many other household problems, knowledge is essential. How is the ignorant cook to know that what lurks unseen in crack or seam may bring to naught all her precautions? The homely old dictum that the only way to conquer dirt is by "eternally keeping at it" is as true as ever it was, but as we have come to realize more and more the insidiousness and omnipresence of the enemy to health, and that in the form of bacteria it consorts with dirt, we realize also that every housekeeper and houseworker must be made to understand something about the microscopic forms of life which are harmful, and how to apply all the weapons which modern science has discovered for their destruction.

FLIES AND FOOD.

The intelligent housekeeper of this generation has at her command a wealth of scientific knowledge that may be applied to the solution of problems in home sanitation. Of great value are the means which have been devised, thanks to the work of the Bureau of Entomology

^a The New Hygiene. New York, 1907.

of this Department, the agricultural experiment stations, the state boards of health, and investigators in many universities and other institutions, to prevent the spread of disease by insects and other forms of animal life. In the nature of things the importance of this matter was not recognized until it had been shown with certainty that such animal life played an important part in the transmission of disease. Two varieties of mosquitoes are generally conceded to be absolutely necessary to the transmission, respectively, of malaria and of yellow fever, since the organism that causes these diseases must first undergo a complicated series of changes in the body of the insect before it is capable of producing a new case. Thus, the mosquito bites a yellow-fever patient and takes the micro-organism into its body, and there for some twelve days it is developed to the stage of maturity, after which time and not before the mosquito can convey the disease by biting. In such cases the insect is called an "intermediary host." Both diseases are now successfully fought by exterminating the breeding places of the mosquito and by the screening of dwellings.

Insects play a still larger part as mechanical carriers of disease germs, the greatest menace of all in our daily life being the common house fly, known to scientists as the *Musca domestica*. It is not a biter, like the horsefly and some other flies, or like the mosquito, but it has its own way of carrying infection. It breeds in manure and it feeds on it; it feeds on the sputum of diseased throats and lungs, on typhoid dejecta, and refuse of all kinds, and by means of its hairy feet and legs it carries about and distributes particles of these vile feasts, which frequently contain living germs capable of producing a new case of disease. In still another way does the fly spread disease—disease germs taken into its body in food are known to remain alive in the intestines and also for days after they are ejected in the "specks," i. e., in the fly excrement. By recent experiments with animals this has been proved true of both the tuberculosis and the typhoid bacillus, the germs in the "speck" having actually given the disease from nine to fifteen days after it was voided by the fly. Also the eggs of worms that it draws into its body with water that it drinks are known to remain alive and to hatch after being ejected.

The case against flies is well proved, and yet they are allowed to infect the joint of meat exposed for sale by the butcher, the bread and sweetmeats of the confectioner's counter, berries and other fruit, the edge of the milk pail, the kitchen table and utensils, and the food of our table. They were shown to be the principal carrier of the typhoid fever which attacked 20 per cent of the United States soldiers in the Cuban war and furnished 86 per cent of the deaths.

As the report^a states, "Flies undoubtedly served as carriers of infection. * * * It is probable that the infection was [also] disseminated to some extent through the air in the form of dust." Furthermore, it is pointed out that the men undoubtedly spread the disease by means of infected material conveyed on their persons and clothing. Water was not regarded as an important factor in the spread of typhoid fever in the national encampment of 1898. Since that time so many well-proved cases have been traced to the fly that Dr. L. O. Howard^b recommends that the name "typhoid fly" should be generally adopted, in order to call attention to the danger of allowing this insect access to our dwellings.

In the monthly report of one of our state boards of health^c is graphically described a scene familiar to many of us:

In front of a grocery boxes of blackberries were exposed for sale. They were slightly gray; dust and swarms of flies were present. On the sidewalk, within 6 feet of the berries, some poor diseased mortal had spat, and this sputum was circled with flies. A moment's observation showed that they flew back and forth, not only between the berries and the sputum, but also between the berries and the gutter filth and street manure. But, most wonderful, people purchased those nasty berries and ate them raw.

It was found later that much diarrhea existed in the neighborhood, caused possibly by bacteria transmitted by these very flies.

We are far too tolerant of the presence of this filthy and dangerous insect. Its breeding grounds should be the first point of attack. The Bureau of Entomology of the Department of Agriculture has given a great deal of attention to the matter, and the publications of the Bureau should be consulted for full data on the subject. A summary may be found in an earlier bulletin of this series.^d On the authority of this Bureau it is stated that at least 95 per cent of the town and city flies are bred in heaps of horse manure left in roads, fields, and stables. The remedy proposed is stricter enforcement of the laws governing the cleaning of streets, and the covering of all manure pits in town and country, with occasional spraying with crude petroleum. The manure pile and the barnyard are the fly-breeding ground of the farm.

To urge the housewife to work for public measures to insure such sanitary reforms is not asking her to go too far afield. In her own house she will endeavor by the use of screens and fly paper and similar means to protect herself from this dangerous insect. But she will

^a Abstract of Report on the Origin and Spread of Typhoid Fever in United States Military Camps during the Spanish War of 1898. Washington, 1900.

^b U. S. Dept. Agr., Bur. Ent. Bul. 78.

^c Mo. Bul. Ind. Bd. Health, 10 (1908), p. 64.

^d U. S. Dept. Agr., Farmers' Bul. 155.

wage an unequal battle unless the root of the evil is attacked, and this can only be done by removing manure and other refuse that form the breeding places of the fly. This question is considered in the government documents referred to (p. 16).

Briefly, the manure should be collected in pits where it may be kept covered, or where it may be treated with kerosene oil or some other material which kills the eggs and larvæ. It is of still greater importance that flies should never have access to human excreta.

DUST IN ITS RELATION TO FOOD.

What is the composition of dust? It has been described as a little of everything. In the paved streets of cities and towns earthy particles from the soil are always present. While street dust in the country is largely made up of the powdered earth of the road mixed with finely ground manure, in cities its lighter particles are principally dried horse manure with more or less of dried powdered sputum; facts sufficiently disgusting to give us a hearty aversion to dust as an accidental accompaniment to any article of food. The dust of rooms contains earthy particles, minute fragments of clothing fiber, bits of abraded skin, and pieces worn away from walls, floor, and furniture, also mold spores, bacteria, and street dust in greater or less quantity, according to the location.

Every precaution should be taken if there is illness in a house, particularly tuberculosis or other infectious or contagious disease, to prevent the micro-organisms which cause the disease from getting into the air and dust. Dr. Michael Prudden^a gives the results of attempts to count the bacteria in the dust of New York streets. A culture plate of 3½ inches in diameter was exposed for five minutes with the following results: Central Park, near street, collected 499 bacteria; Union Square, collected 214 bacteria; large dry goods store, collected 199 bacteria; street while being swept, collected 5,810 bacteria.

The daily examination of the milk of a certain model dairy revealed suddenly a great increase in the bacterial count. The physician and the bacteriologist examined the premises and watched every process in a vain effort to determine the cause until it was noticed that the milk pails were put to sun where the dust blew on them. This cause removed, the bacterial count returned to normal.

These air and dust bacteria are not necessarily harmful, but where large numbers are present there are likely to be among them those which produce disease. A number of cases of illness are on record

^a Dust and Its Dangers, p. 26.

directly traceable to fruit, but it is difficult to determine whether in such cases infection has come through dust settling on the food or through direct contact of the fruit with infected human beings.

Better market inspection is needed, better protection for food from dust both in transit and when on sale, and a more rigid carrying out of existing laws, but, above all, a demand for clean food on the part of the buyer.

Precautions should also be taken against dust after the food is delivered at the house. In modern dairying much stress is laid on the fact that sweeping the stable before milking fills the air with bacteria which are likely to infect the newly drawn milk. The same danger arises if food and dishes are left exposed in kitchen or pantry during sweeping. Tests have been made to determine how great this danger really is in ordinary household practice, and it has been found not only that molds, yeasts, and bacteria are much more abundant in the air during sweeping, but that those stirred up by the sweeping do not settle back again for several hours afterward. Evidently, then, it is not sufficient to cover food and dishes during the actual sweeping; they should remain protected for some hours. Dusting with a dry cloth or feather duster also stirs the micro-organisms into the air; for this reason a damp cloth to which they will stick is greatly preferable for cleaning in kitchen, pantry, and china closet; in fact, everywhere. These considerations also show the great sanitary advantage of modern cleaning devices, of which a number of sorts are now on the market, by which the dirt is sucked through tubes into suitable receptacles. Bits of damp newspaper or damp sawdust sprinkled on a floor will hinder dust from rising when the room is swept, but the wooden or linoleum-covered floor of a well-kept kitchen and pantry should furnish very little dust. Larger particles should be lightly brushed up and the floor washed every few days.

PET ANIMALS IN THE KITCHEN.

Another possible source of danger, but one frequently overlooked, would seem to be the pet animals of the household. The fur of even the most cleanly cats and dogs must come in contact with many things which we would not care to have touch our food. In many families where the animals are not allowed in the living rooms for fear of soiling furniture they are given free range in kitchen and pantry, where the chances are they will leave more or less loose hair and dirt which may find its way to food utensils or to food.

A word should also be said regarding animal pests. Rats and mice are regarded by all housekeepers as destructive and disagreeable in every way, and no one cares to eat food which they have touched. Traces of the presence of mice may sometimes be noted in cereals

and other foods sold from open boxes and similar containers in markets and shops which are careless in such matters. This suggests another reason for keeping such foods in glass jars or tin cans or similar receptacles in shops and in the pantry and storeroom. In addition to the food which they destroy and the pecuniary loss involved, rats and mice are a menace to health, as they are known to be carriers of disease. Many investigations have been reported which show their connection with the spread of trichinosis and with bubonic plague. Data summarized by the New York State Department of Health^a indicate that the rat may be a large factor in transmitting diphtheria and other communicable diseases.

The question of the losses due to rats and methods for destroying these pests are considered in an earlier bulletin of this series.^b

THE FOOD SUPPLY.

That food which is brought into the home shall be clean and of good quality is a matter of the greatest importance. Vegetables and fruits should be grown and milk and other dairy products produced under proper conditions (see pp. 13 and 17), and all the products of the farm and garden which pass through the dealer's or manufacturer's hands should reach the kitchen in a clean and wholesome condition.

Since the passage of the National Pure Food and Drugs Act, giving to the United States Government authority to enforce stringent laws against the adulteration and misbranding of foods which enter into interstate commerce, and the more rigid enforcement of similar state laws which regulate these matters in many of the States, a great burden has been lifted from the shoulders of the buyer. This legislation has enormously decreased the deceptions formerly practiced by some manufacturers, and since it insures that the name and description on bottle and package shall not misrepresent the contents, the buyer, if he knows what he wants, will have no difficulty in obtaining it, while the honest manufacturers and dealers (and they have without doubt always outnumbered the others) will also be protected. This matter in its various aspects is taken up in publications of the Bureau of Chemistry^c of this Department.

The national laws regarding the inspection of meat and meat products are a further and very important protection of the home food supply. Publications of the Bureau of Animal Industry^d of this Department deal with the question of meat inspection in relation to wholesomeness and quality. But the buyer has still to choose among

^a Mo. Bul. N. Y. State Dept. Health, n. s., 4 (1909), No. 3, p. 74.

^b U. S. Dept. Agr., Farmers' Bul. 369.

^c U. S. Dept. Agr., Bur. Chem. Bul. 100; Yearbook 1907, p. 321.

^d U. S. Dept. Agr., Bur. Animal Indus. Circ. 125.

many varieties of food that have all met the requirements of the law. There are, for instance, many kinds of canned vegetables that should be carefully compared as to flavor and water content. A 10-cent can of tomatoes that consists of a little partly ripened pulp swimming in water may be much dearer than a 15-cent can with a lower water content. The writer compared two cans of tomatoes on the basis of the amount of pulp of a given consistency that they yielded on straining. As the 15-cent can yielded twice as much as the 10-cent can, and the pulp was also of a better flavor, the cheaper can should really have sold for 7 or 8 cents in order to vie with the other in real food value.

CLEAN SHOPS AND MARKETS A NECESSITY.

The buyer as well as the merchant is responsible for the dirty market and shop, for if they were not tolerated by the purchaser they could not exist. The condition of the food when it enters the home is a matter of the utmost importance in relation to the subsequent handling and use, and great care is to be exercised in choosing clean rather than dirty places in which to purchase food. As yet the buyer has but little protection through the enforcement of law regarding unhygienic conditions existing in places where food is offered for sale. Let us hope, however, that this state of things will soon mend. In some States the boards of health are already active in the inspection of dairies, and the inspection of slaughterhouses has made great progress under the United States laws.

Even to the untrained eye the markets and provision stores are often dirty places. In too many of them all manner of foods are exposed to dust and flies, and in the long list may be found many that are "ready to eat," such as cooked meats, butter, cheese, bread, cake, figs, dates, pickles, and candy. In boxes on the floor, leaning at an angle against the counter, or on the pavement outside, may often be seen green vegetables, macaroni, and fresh fruits exposed to street dust which is in good part finely ground horse manure and other filth. A crate of berries may be seen on a stand outside unprotected from dust or from the visits of countless flies.

There are, of course, many market men and grocers who have clean, well-kept, and sanitary places of business, but the care of the market stall or provision store is too often in the hands of people who are not only ignorant of the hygienic reasons for avoiding dirt but also devoid of any real instinct for cleanliness, in so far, at least, as it applies to commercial matters. In such shops the meat block is seldom scraped and scrubbed, oysters are opened into dirty pails, and floors and shelves are infrequently cleaned. The grocer's assistant may come in directly from unharnessing the horse to take your crackers from the

barrel, and his hands are not washed between drawing a fowl and cutting a beefsteak. The butcher or grocer's apron in a case recently noted served some of the uses of a handkerchief and yet it was in almost constant contact with food. Such topics are not pleasant, but conditions will not be mended until housekeepers take notice of such things, protest against them, and confine their buying to the shops which are run by men who can be trusted to abolish all such uncleanly ways.

If the average person finds these conditions and practices offensive, because they are unclean and unnecessary, how much more disturbed are those who have learned that in addition such practices involve bacterial contamination of foods, some of which are eaten raw.

The praise and blame of the buyer has much to do with keeping up the standards of the dealer, and it is held by some writers that the growing use of the telephone in ordering the dinner, thus bringing about absentee buying, is responsible for many bad conditions.

If buyers will think of these things and patronize the clean, progressive, and sanitary shops in preference to the others it will do much to insure better standards. It is the opinion of many, however, that the law is, or should be, the final resource. In some cities associations of housekeepers have joined in demanding better hygienic conditions in markets and have obtained what they sought.

SANITATION OF BAKERIES.

When we buy a loaf of bread in a shop whose counters are clean and whose show case carries a tempting array of cakes and rolls, we are not to conclude, as a matter of course, that the bakery at the rear or below stairs would also meet our approval. Not one customer in a thousand sees the conditions under which bread and pastry are manufactured, and it is this very removal from public view and criticism that constitutes the chief difficulty in enforcing existing laws for the proper construction of bakeries and for sanitary methods of carrying on the business.

Not long ago one-half the bread consumed in London came from cellar bakeries, and while it is true that a cellar bakery may be hygienic, the chances are strongly against it.

There are, of course, very many sanitary and clean bakeries and workmen who are careful in their work and neat in habits, but the reverse condition too often prevails. One London bakery is described in a recent report as 30 feet long by 7 or 8 in width, with bags of flour ranged on one side and the dough tubs placed along the other. In the same room were found open sanitary arrangements, poor sewerage leaking out foul gases, a defective oven letting out fumes of coal gas, open cracks in the ceiling through which sifted dust from the store above, and the stifling air was unchanged by ventilation.

In one of our Northern States a few years ago health inspectors examined 547 bakeries in 25 towns and 3 cities and reported that from a sanitary standpoint 270 were distinctly bad, 222 not especially bad, 44 satisfactory, and 11 worthy of especial commendation.^a Similar conditions have been found in other localities.^b

Most difficult to change are the personal habits of the workmen where they are careless and lacking in cleanliness.

In some bakeries floors and even vats were scrubbed but once a year; in some there was no provision made for washing the hands.

From such bakeries most persons do not care to buy their bread, if they are willing that men should be allowed to labor in such surroundings. It should not be forgotten that the buyer of food has many opportunities to help in raising standards that will affect the whole community. It is quite within the rights of the buyer to insist on inspecting the place where the food is prepared, but it is better to accompany the official inspector. Some of the bakeries will be found above reproach, and these are the ones which the careful housewife should patronize.

The inspection of bakeries is provided for by legislative enactments in some cities and States and is an important hygienic measure. Great improvements have been made in recent years in the construction of bakeries and in bread-making machinery and other equipment, all of which makes for more sanitary conditions. It is encouraging to note that progressive bakers realize the importance of cleanliness and sanitation and manifest a marked interest in all that pertains to such matters. As an instance of this may be mentioned the work of the bakers' institute in one of the Western States.^c

It has been proposed that a law should require that the loaf of bread, as soon as baked, should be put in a paper bag and thus handled and transported, but it is sometimes difficult to carry out reforms of this kind if they conflict with the prejudices of the buyer. A baker in one of the large cities whose methods were known to the writer started this method but did not succeed in popularizing it. People wanted to "see the bread," and it entailed an expense which the buyer was not willing to meet and which the baker thought that his profits would not warrant. Other cities or other bakeries have without doubt had a different experience. At any rate, bread or rolls thus wrapped in paper, often of a transparent nature, are served in some restaurants and hotels and on some dining cars.

^a Mass. State Bd. Health Rpt., 38 (1906), p. 607.

^b Bien. Rpt. Bur. Labor and Indus. Statis. Wis., 13 (1908), pt. 5.

^c Bien. Rpt. Bur. Labor and Indus. Statis. [Wis.], 13 (1906-7), pt. 5, p. 719.

THE QUALITY OF MEATS.

In order to become a good judge of meats it is very helpful to have a few lessons from an experienced buyer. The different cuts will thus be easily learned, but the quality of the meat depends on so many factors, as the age of the animal, the breed, and the method of fattening, that it is easy to make mistakes in choosing, and the buyer will often be wise in accepting information from the dealer, if he is one who prides himself on keeping first-class meats. Having found such a one, the customer who wishes to save time and money will continue to buy of him. The very large amount of meat which some housekeepers provide is not necessary. In general it is better to use a reasonable amount of that which is in prime condition rather than to economize on the quality. The meat is easily supplemented by other dishes, and the whole meal will thus be better balanced than would be the case if a larger amount of inferior meat were provided. Although not generally understood, it is just as important that the cheaper cuts of meat, as well as the dearer ones, should come from a well-fattened animal.

THE TRUE PRICE OF MEATS.

There is an apparent and a true price of meats, a fact that is not always considered. It may be more economical to pay 15 cents for a cut of clear meat than 8 cents for one that contains nearly half its weight of bone, sinew, and fat. The apparent price of chicken may be 20 cents a pound, but its real price will often be 50 cents, when the weight of head, legs, entrails, crop, and bones is taken into account.

POULTRY.

There is much discussion regarding the merits of drawn and undrawn poultry. Most dealers contend that in warm weather a fowl which has had entrails and crop removed spoils much more quickly, because of the extent of cut surface exposed, than does undrawn poultry. The writer found in a large city market but one dealer who kept drawn poultry, and he said that he could not do so except for the fact that steady customers took all of his stock, so that nothing was left on his hands. The extra price that he charged per pound was only sufficient to make up for the loss in weight.

The Massachusetts State Board of Health^a has recently studied this question and found that if the entrails were so drawn that none of their contents were spilled inside the body, the bird kept better than in the undrawn state. The work of the Bureau of Chemistry on this subject is referred to later. (See p. 26.)

^a Mass. State Bd. Health Rpt., 39 (1907), pp. 265, 287.

It is greatly to the housekeeper's advantage to buy fresh, well-drawn poultry, for not only is the flavor injured by the unclean practice of allowing the entrails to remain in the body, but it is thought to favor the development of ptomaines. It has been shown that after death the intestinal juices with their contained bacteria are able to pass through the walls of the intestines into the muscle fiber, and this process goes on even though the fowl is kept at a very low temperature. In some States cold-storage fowls are required by law to be sold as such.

FISH.

Regarding fish, one quality is so all-important that the buyer is warranted in giving the order: "Any kind that is fresh." The dealer knows what he is selling. The buyer may not be able to discover from lack of experience in the effect of ice and cold storage. It is safe to rely on a good dealer if the buyer is a good judge of fish when it comes on the table and then holds the dealer strictly to account. Fish that has been kept for a week or more on ice has lost its distinctive flavor, although it may not be spoiled. It has what the cook calls a "woolly" taste. Shellfish form a delicious addition to the diet, but if they have been grown or fattened in sewage-infected water they may carry disease germs. As it is in general impossible to learn their origin, the rule of never eating them in the raw state is adopted by many. The practice of fattening or "floating" oysters in fresh or in brackish water robs them of much of their fine flavor, and since the most accessible supply of such water is at the outlet of streams, and as such streams are frequently polluted by sewage, many persons believe that this practice should be forbidden by law.

In many European cities fish are sold alive, the customer selecting his fish as it swims in a tank. It would seem that this excellent method might be used in our own cities, especially those situated on the seaboard, at least for customers who are fastidious and who are willing to pay an extra price for special articles when it is warranted.

VEGETABLES.

Only those who have been accustomed to eating green vegetables fresh from the garden realize in what poor condition are many of the vegetables sold to the city buyer. Some varieties, as green peas, are so delicate in flavor that even a few hours' removal from the vines brings about a change. Indeed, the market gardener has been obliged to develop the keeping qualities of vegetables and fruit at the expense of flavor.

If lightly packed and transported only a short distance, the deterioration in most vegetables is not noticeable, but if closely packed

for any length of time changes due to the action of enzymes or "ferments" normally present in the living tissue take place, with a consequent loss of flavor.

In green corn, for example, the ferments present begin immediately to destroy the contained sugar, and thus the corn is robbed of flavor very shortly after picking. These changes are often accompanied by changes in appearance by which they may be detected, especially in green corn and in peas and beans. Pods inclosing peas should be crisp and plump. String beans should not have a faded look or any suspicion of toughness or limpness when broken. Green corn should show fresh husks or "shucks" of good color, not wilted or partly dry, nor lacking the "bright" look of the fresh ear. Cabbages should be crisp and bright of color. Cucumbers, turnips, and carrots should be firm to the touch. Lettuce, if of the headed variety, should have firm, bleached hearts, showing no trace of the rusty red look that announces long keeping. It will keep its freshness longer if the root is left on.

Some market men and grocers grow part or all of their own vegetables, and make a practice of having only fresh ones of good quality in stock, though the combination of market gardener and grocer is, in the nature of things, not common. A much larger number of market men and grocers are very particular to procure for sale only fresh vegetables, and here again the discriminating buyer will patronize the dealer who is to be trusted.

When housekeepers buy vegetables of peddlers, they should patronize, if possible, the grower rather than the huckster. The grower must sell out and go home, and it is to the huckster that he sells his surplus, and this surplus is often so manipulated as to sell for fresh goods until the next market day. The huckster in his off hours may often be seen trimming off the wilted outside leaves of celery, cabbage, and lettuce and giving a fresh surface to the stem, and sometimes rinsing or sprinkling the lettuce with water not infrequently far from clean. The beets which were left over, after losing little by little their tops, are sold by measure to whoever will buy.

It may be said in general that when a given vegetable is cheapest then it is best, for all conditions are then favorable to its development. Potatoes should be bought in a fully ripened state, not too young, nor is it necessary to eat them when they have become too old, as it is easy to find substitutes such as boiled rice, hominy, and similar foods.

Vegetables of medium size, neither very large nor very small, will be generally found to be the best, and most housekeepers consider them the most economical, as they may be cooked and served with least waste.

THE STORAGE OF FOOD.

In earlier times a larger proportion of the food supply was stored at home than is now the case. Even in cities and towns supplies were commonly purchased in bulk. Owing to the improvement in transportation facilities and to other changed conditions storage of food outside the home has developed into an enormous industry. As was the case with markets and food manufactories, the storage plant is a matter in which the housewife is interested, as it has to do with the character of the food which comes into the home.

COMMERCIAL COLD STORAGE.

Cold storage as applied to whole carcasses of beef and mutton has been of great service to the buyer. By its aid prices are equalized and we are furnished even in summer with meat that has been made tender by keeping.

The service rendered by cold storage of fish and poultry is not so thoroughly well established. The subject is being carefully investigated by experts. Apparently, if the process is carried out in the best manner and the goods not kept too long in storage, the cold-storage fish and poultry are wholesome. From the results of an investigation of the quality, flavor, and wholesomeness of cold-storage turkeys, drawn and undrawn, the changes brought about by storage, and similar matters carried on for the Buffalo, N. Y., Department of Health,^a the conclusion was drawn that under proper regulation cold storage can be safely employed for poultry, but that regulation is essential. The question of the effects of cold storage on the character of meat and other food products, the comparative merits of drawn and undrawn poultry, and similar matters are being investigated by the Bureau of Chemistry of this Department and are discussed in its publications.^b

With all cold-storage foods it is important that there shall not be a long interval between removal from storage and cooking, and this is particularly the case with poultry and fish. Foods that have been frozen and then thawed seem to furnish particularly good ground for bacterial growth, or what we call "spoiling."

Storage of fruits and vegetables, which is coming more and more into use, gives us many out-of-season articles. The same is true to a great extent of turkeys and other domestic poultry, for food of this kind is largely of seasonal production, and cold storage seems to be the only method by which the fresh material can be kept for a long period for market purposes. In the case of many sorts of cold-

^a Buffalo [Dept. Health] Sanit. Bul., n. ser., 2 (1909), No. 3, p. 1.

^b U. S. Dept. Agr. Yearbook 1907, p. 197; Bur. Chem. Bul. 115.

storage fruits and vegetables it is the common opinion that their quality is hardly as good as that of fresh ones. On the other hand, if handled under the best conditions much of the cold-storage goods, such as apples and other fruits, is of excellent quality. Indeed, it is difficult to imagine how housekeeping could be carried on, particularly in large cities and towns under modern conditions of home construction (with limited storeroom, etc.) without the cold-storage industry. For this reason it is all the more important that the housewife should be informed as to the best ways to handle such commodities, and should use her influence to insure the best conditions in the cold-storage industry.

THE STOREROOM IN THE HOME.

The storeroom for food may be the tiny closet of the flat dweller in a city or the cellar of the village or farm house. In the last case it often has a commercial as well as a household value, since it keeps fruits and vegetables in good condition until marketed, as well as until they are needed for the home table; but in any case, it should be cool, dry, clean, and regularly aired.

It may be well to describe a cellar that is badly built and carelessly kept, in order to see what should be exactly opposite conditions.

Such a cellar may be dug in wet ground, without sufficient drainage of the subsoil; it may even be in contact with open sewers or drains, which have been proved in certain cases to contain specific organisms capable of producing disease. In many cases the cellar built against an earth wall is not protected from dampness by a layer of moisture-proof cement, and the water may stand in drops on its surface. Again, it may be dug to such an extent below the surface of the ground that the windows are wholly inadequate for lighting and ventilation.

It may have an earthen floor, or one of badly matched boards impossible to keep clean. It will probably have a musty smell, proof positive that mold plants are there and ready to attack any fruit and vegetables stored on its shelves or in its dirty bins.

If, in addition to this faulty construction, the cellar is badly kept, bits of rotting fruit and vegetables being left about, not only will these conditions favor the spoiling of food, but they may prove injurious to the health of the family living above stairs.

A cellar that meets modern requirements must be dug in ground that is well drained either naturally or by artificial means. It must be remembered that a cellar is not, first of all, a storeroom; it is an essential part of a well-planned house, especially necessary in our Northern States, in helping to keep an equable temperature; and if its walls and floor are what they should be it prevents dampness and ground air from rising into the house.

If the house is set close to the ground the cellar windows must be wide enough to compensate for their lack in height, and must be set opposite each other in order to insure good draft. A method that is sometimes used is to dig out a space in front of a window, making a little area which, laid in either brick or stone, may be whitewashed and reflect light into the cellar, as is shown in figure 1; it also allows of sinking the cellar window deeper and obtaining better ventilation.

This matter and related topics are considered in a recent volume^a on farm home construction and similar questions.

The walls and floor of this cellar should be laid in Portland cement to keep out moisture, and the walls and ceiling should be whitewashed twice a year. Even if a cellar is kept very clean, the earthy smell of vegetables that arises from it when it is well stocked is not agreeable—another reason for good ventilation and frequent airing. A separate room may be partitioned off from the cellar in one corner

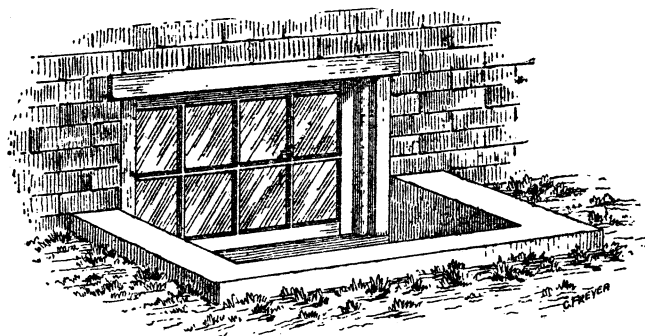


FIG. 1.—Cellar window constructed to secure ventilation.

for storage purposes. This can then be kept darker than one would wish to keep the rest of the cellar. Such a room must, of course, be aired now and then. In this storage room should be placed a movable safe with wire-netting sides, and a swinging shelf; and broad shelves should be built high enough so that barrels may be shoved under them.

The writer once saw in Holland a cellar that met every possible requirement of hygiene. The floor and side walls were of closely matched tiles laid in cement, making it as tight as a dish and as easily cleaned. It was not large, but its wall space was so utilized that it furnished ample storage facilities for a large restaurant.

HOT-WEATHER STORAGE.

The storage of food in cold weather is a comparatively simple matter, since the low temperature, which is a prime requisite for checking the growth of bacteria and molds, is furnished by nature and we have only to guard against freezing. The keeping of perishable foods in warm weather is best accomplished by artificially cooled air.

^a The Healthful Farmhouse. Boston, 1906.

ICE MACHINE.

On a large dairy farm or wherever the household is large enough to warrant it an ice machine may be used which is driven by an electric motor of suitable horsepower, or by a gas or some other suitable engine, which operates a brine tank and furnishes very cold dry air to the ice chest. Such clean, dry air at a constant low temperature furnished from outside is so superior a method of cooling food that the ordinary ice chest seems a poor thing in comparison, though in the majority of homes it is the only resort.

ICE CHESTS.

There are many varieties of ice chest or refrigerator, all built on one of two general plans. In one kind both ice and food are kept in one large compartment. In the other the ice is placed in a top compartment, below which are cupboards for the food; the principle here utilized is that cold air seeks a lower level and that the air cooled by the melting ice will sink to the shelves below. It probably better utilizes a given amount of ice, for the further reason that the ice compartment may remain tightly closed except when being filled. In both cases the air space between the outside wall and the zinc lining is filled with some nonconducting material, as cork or asbestos.

It is of great convenience to have the ice chest built against the outer wall of kitchen or pantry, so that it may be filled from the outside by means of a small door cut for that purpose. In such a case it is of course advisable to choose a wall on which there is little or no sunshine. The ice box may also be drained by a pipe leading to the outside and then properly cared for, thus saving much labor in the emptying of pans. It is not considered safe to connect it with the house sewer because of the danger of sewer gases "backing" into it, even if a good trap is provided.

CARE OF ICE CHESTS.

If on a warm summer day you put your hand into an ice box well filled with ice you may think that the temperature is very low, and yet it is in all probability nearer 50° than 40° F. As low a temperature as 40° or 45° is only to be obtained in a very well-constructed box with a large receptacle for ice, and then only for a short time after it is filled. A box that maintains but 60° is, however, very useful in keeping food from day to day.

The ice box, no matter how well cooled, is and must be damp, and dampness is one of the requirements for bacterial growth. It must be remembered, also, that some varieties of bacteria grow at low temperatures. Therefore the interior of an ice chest should be

wiped every day with a dry cloth and once a week everything should be removed, so that sides, shelves, and drain may be thoroughly scalded. The water must be actually boiling when it is poured in, and the process repeated several times.

In the small ice chests, where all the ice space must be utilized, the cube of ice will be a tight fit, and it is difficult to lower it to the grating. If the ice is put on a piece of stout cloth whose ends are long enough to reach above the top, it may be lifted by these ends and easily deposited in place. The cloth folded about it serves also to protect the ice from the heat of the outside air, and holds any bits of dirt that may have been frozen into the ice, thus preventing them from settling to the floor of the box or lodging in the drain pipe. The cloth should be scalded after each using. A folded newspaper laid on the floor of the one-compartment ice box serves the same purpose as to cleanliness. It must be remembered that refrigerator ice is often dirty, and that it may bring in putrefactive or even typhoid bacilli, for most bacteria are resistant to low temperature and are not destroyed by freezing. On this account no food should be brought into direct contact with it, nor should it be put into drinking water, unless its purity is above suspicion.

All cooked food should be cooled as soon as possible before being placed in the ice box. Butter may be kept from taking up the flavors of other food by keeping it in a tightly covered receptacle. Milk requires more access of air, but in a clean ice box in which no strong-smelling food is kept milk should remain uninjured in flavor for twelve to twenty-four hours. If vegetables or other foods of pronounced odor are kept in glass jars with covers or in covered earthenware receptacles there will be fewer odors to be communicated. Portions of canned food should never be put into the ice box in the tin can. Such food does not of necessity develop a poisonous product, as has sometimes been claimed, but experiments show that ptomaines are particularly liable to develop in such cases. Casting out this somewhat remote possibility, the "tinny" taste acquired by such keeping is enough to condemn the practice.

Foods that are to be eaten raw, such as lettuce and celery, should be carefully cleaned before being placed in the ice box, and may with advantage be wrapped in a clean, damp cloth. If they are to be kept for some days they should, however, be put in without removing the roots, the further precaution being taken to wrap them carefully in clean paper or to put them into grocers' bags.

WATER FOR COOLING FOOD.

There are many ways of lowering temperature by utilizing the fact that water when evaporating draws off heat from surrounding objects. If a pitcher of water be wrapped with a cloth which is kept

saturated and exposed to a draft of air the temperature of the water in the pitcher will be lowered by several degrees.

A receptacle in which food is placed may be cooled in the same way. Take a wooden box with a sound bottom made of one piece and invert it. Tack a layer of cotton batting over it and cover with some coarse cloth. It is now to be kept wet by some contrivance that will furnish an automatic drip. The writer used for this purpose an old aluminum pan which had in it a half dozen very tiny holes, and when filled with water it supplied just enough water to keep the cloth saturated. Under this box lettuce in cold water, a cold pudding, a pat of butter, and other food were placed and kept in good condition. A pan of milk lowered into another of cold water is kept from souring many hours longer than if it was unprotected from the surrounding air. Spring water of low temperature is used by many farmer's wives to keep milk and butter cool, and a "spring house" is a common thing on many farms, though less depended upon than was the case before ice houses, refrigerators, and ice chests became so common.

It is also an old-fashioned practice to lower foods in covered pails into the well and suspend them not far above the surface of the water.

WINTER STORAGE OF FOOD.

In the Southern States storage problems are not the same as in regions where the winter is severe, and many roots and other vegetables may be left in the ground with little or no protection, while crops may even be grown throughout the year, thus doing away largely with the need of winter storage. In the greater part of the United States, however, the problem of keeping at least a part of the food supply through the cold season is an important one, and the more important the longer the winter season.

The farmer will without question keep in cellar or storeroom or outside cave or pit the surplus of what is raised on the farm. Whether it is wise for others to buy food in large quantities and store it for winter use depends on whether it can be bought at a sufficiently low price to pay for the care and risk that the keeping entails, as well as on market facilities, the amount of storage space available, and similar factors. But the storing of smaller quantities of food is both convenient and economical and is an absolute necessity for families who live at a distance from market.

A WINDOW STORAGE BOX.

The dweller in a small apartment who has no cool cellar in which to store perishable articles may find an outside window box useful in winter.

A carpenter may be hired to construct a box that will exactly fit outside a kitchen window, if possible on the north side. Such a device has been described in a number of books and bulletins.^a It should come halfway up the lower sash and contain two deep shelves, and when the sash is raised the contents of these shelves are easily accessible. In freezing weather the sash may be left up, and thus the box becomes a part of the warmed room. A sash curtain will conceal it from the room. Such a window box is often fully as



FIG. 2.—Window box for storage of food.

great a convenience in the farm or village home as in the city flat. Figure 2 shows a way in which it may be constructed.

A more inexpensive way is to hang a neat wooden box, well cleaned, on strong nails or spikes outside the window. A heavier box may be supported on brackets. The box should have a tight-fitting hinged lid and be lined with asbestos paper to equalize extremes of temperature, while a lining of oilcloth will admit of easy cleaning. A shoe box would be good for this purpose. It might be painted the color of the house.

^a Cornell Reading Course for Farmers' Wives, 1. ser., No. 1, p. 6—Farm House and Garden; No. 3, p. 52—Housekeeping; also Reading Lesson Sup. 1.

THE KEEPING OF VEGETABLES, FRUITS, AND MEATS.

The following hints regarding the keeping of different kinds of food may be found useful:

Potatoes are kept without difficulty in a cool, dry, and dark place. Sprouts should not be allowed to grow in the spring.

Such roots as carrots, parsnips, and turnips remain plump and fresh if placed in earth or sand filled boxes on the cellar floor.

Sweet potatoes may be kept until January if cleaned, dried, and packed in chaff so that they will not touch each other.

Pumpkins and squash must be thoroughly ripe and mature to keep well. They should be dried from time to time with a cloth and kept, not on the cellar floor, but on a shelf, and well separated from each other.

Cabbages are to be placed in barrels, with the roots uppermost.

Celery should be neither trimmed nor washed, but packed, heads up, in long, deep boxes, which should then be filled with dry earth.

Tomatoes may be kept until January, if gathered just before frost, wiped dry, and placed on straw-covered racks in the cellar. They should be firm and well-grown specimens, not yet beginning to turn. As they ripen they may be taken out for table use, and any soft or decaying ones must be removed.

Apples, if for use during the autumn, may be stored in barrels without further precaution than to look them over now and then to remove decaying ones; but if they are to be kept till late winter or spring they must be of a variety known to keep well and they must be hand-picked and without blemish or bruise. They should be wiped dry and placed with little crowding on shelves in the cellar. As a further precaution they may be wrapped separately in soft paper.

Pears may be kept for a limited time in the same way, or packed in sawdust or chaff, which absorbs the moisture which might otherwise favor molding.

Oranges and lemons are kept in the same way. Wrapping in soft paper is here essential, as the uncovered skins if bruised offer good feeding ground for mold. Oranges may be kept for a long time in good condition if stored where it is very cold but where freezing is not possible. Lemons and limes are often kept in brine, an old-fashioned household method.

Cranberries, after careful looking over to remove soft ones, are placed in a crock or firkin and covered with water. A plate or round board placed on top and weighted serves to keep the berries under water. The water should be changed once a month.

In winter large pieces of fresh meat may be purchased and hung in the cellar. Thin pieces, as mutton chops, are sometimes dipped in

mutton suet, which keeps the surface from drying and is easily scraped off before cooking.

Turkeys, chickens, and other birds should be carefully drawn as soon as killed and without washing hung in the coolest available place.

Smoked ham, tongue, beef, and fish are best put in linen bags and hung in the cellar.

Salt pork and corned beef should be kept in brine in suitable jars, kegs, or casks, and should be weighted so as to remain well covered. A plate or board weighted with a clean stone is an old-fashioned and satisfactory device.

Eggs may be packed for winter use in limewater or in water-glass solution, methods which are described in an earlier bulletin^a of this series. Many housekeepers have good success in packing them in bran, in oats, or in dry salt, but according to experiments summarized in the aforementioned bulletin, the preference is to be given to the 10 per cent solution of water glass. Exclusion of the air with its accompanying micro-organisms and the prevention of drying out are what is sought in all cases. Packed eggs are not equal to fresh eggs in flavor, but when they are well packed are of fairly good quality and perfectly wholesome.

STORAGE OF GROCERIES, MEATS, COOKED FOOD, AND CANNED GOODS.

Flour comes packed both in barrels and in bags, and the form in which it shall be purchased and kept is of importance to the housewife. Bags have certain advantages over the barrel for both producer and consumer; they pack into freight cars with no waste of space, and the cloth for 8 bags costs less than one barrel; for the consumer, also, it is often convenient to buy in small quantities. But, on the other hand, the bag is too often very flimsy in texture, so that it allows flour to sift out, and is also easily soiled by contact with a damp or dirty floor. The purchaser may well require that the bags be made of good material, so that the contents may be protected from dust and dirt.

On this question Prof. Harry Snyder, of the University of Minnesota, says:

There is no question whatever but what flour improves by storage up to six months and it will then hold its own for some time, depending upon the character of the wheat and the thoroughness with which impurities are removed.

As a general proposition it seems certain that it is economical for the consumer to buy flour in bulk rather than in small sacks at a time. In the fall of the year a small sack of flour for trial purposes can be purchased of the grocer and at the same time he can set aside a barrel of the same flour of the same shipment for future delivery, provided the first sample proves satisfactory. As a general rule the price of flour advances from fall to spring sufficient to more than cover the interest item involved and at the same time the consumer is assured of a good quality of flour.

^aU. S. Dept. Agr., Farmers' Bul. 128.

Aside from accidental contamination the chief destructive agencies in stored flour and similar materials are fungi and bacteria. The fungi or molds break down chiefly the starches of the flour, forming organic acids which make the flour sour. The bacterial growths which are present are chiefly forms which liquefy or break down the gluten, the acid presumably aiding in this. This matter has been studied by H. G. Bell,^a among others, in connection with the problem of commercial storage, and he recommends storage in well-lighted, warm, and dry rooms as a preventive of the development of fungi and bacteria, a method as applicable to farm and town homes as to commercial conditions.

The various prepared or "self-raising" flours are more expensive than the mixture that the housewife can easily make by adding the requisite amount of baking powder to flour and sifting it several times. It is a convenience and a saving of time to keep this mixture on hand, as one sifting provides enough for a month's use in cakes and muffins.

The fact that many breakfast cereals that were once sold only in bulk can be bought in packages is a great advantage from a sanitary point of view. The contents of these packages, if bought fresh and if well cared for, will remain in good condition for months. If made in clean factories, such goods have had little chance for contamination from dust and dirt.

If breakfast cereals are bought in bulk they should be kept in tight receptacles in a cool, dry place. Crackers may be kept like breakfast cereals, either in the packages, in which many sorts are marketed, or in tin boxes or in jars.

Corn meal spoils more readily than flour, and for most families it is best to buy in small quantities.

Rice, tapioca, macaroni, and similar dry materials may be kept without any trouble in covered cans or small crocks in a dry, clean place. The same method is advisable for raisins, Zante currants, evaporated and dried fruits, and similar supplies.

Sugar and salt are best kept, the former in tin, the latter in wooden or crockery receptacles.

Glass preserve jars are perhaps the best and most convenient of all containers for small quantities of almost any food material.

BREAD AND OTHER COOKED FOODS.

While cooling, newly baked bread should be lightly covered with a clean cloth or paper to prevent mold germs and dust from falling upon it, but should not be tightly wrapped in a thick cloth as is the practice in some households, for unless it is aired when taken from

^a Oper. Miller, 13 (1908), p. 591; Amer. Miller, 37 (1909), p. 280.

the oven, it is likely to become "soggy" and damp and thus offers an excellent medium for cultivation of molds. When perfectly cold the bread should be placed in a close receptacle that has been thoroughly scalded and aired. If bread is to be kept for more than two or three days in damp, hot weather, the jar or box should be taken out and sunned for a short time now and then, and again scalded and dried. On no account should portions of a former baking be stored with a new batch.

Cake and cookies should be cooled after baking and kept in tin boxes or in earthenware jars, which, like bread boxes, should be often scalded and aired. Even if these foods are to be eaten at the next meal it is well to keep them in some such receptacle, as it insures protection from dust. A cake, pudding, or pie put out of a window uncovered to cool or in any other place where it is exposed to dust, and in summer also to flies, is something that no careful housewife would place on her table if she stopped to think how easily the food may be contaminated.

CANNED FRUITS AND OTHER CANNED GOODS.

Commercial canned goods may be advantageously bought by the dozen in the autumn, and they do not seem to suffer from even a poor storage place, provided it is not so damp that the cans rust through. If dirty or dusty, the cans should always be carefully wiped before they are opened to prevent accidental soiling of the contents.

Vegetables and fruits canned at home and homemade jellies, jams, and similar foods should be kept in dry, airy storage places, out of direct light. The cans and jars used should be of good quality, and all the usual precautions of good rubber rings (if they are used), and so on, should be taken. These matters are discussed in earlier bulletins^a of this series.

Canning may also be made use of daily for temporary preservation of food, and it is especially valuable where ice-chest facilities are not good. When making soup stock a large quantity is made as easily as a small, and the surplus may be poured, while hot, into fruit jars and sealed. Boiled milk may be thus canned and cooked vegetables which may be at the time plentiful or cheap. Mince meat may also be canned, but it will keep a long time in an ordinary receptacle if melted suet be poured over the top.

Such canning, especially of soup stock or milk, is only recommended for a few days' keeping, and every precaution should be taken that is familiar in the ordinary canning of fruit or vegetables.

^a U. S. Dept. Agr., Farmers' Buls. 203 and 359.

LABELING FOODS IN PACKAGES AND CANS.

Many otherwise good housekeepers are very indifferent about labeling. They trust to their memory as to what is in each jar or package, and sometimes with disastrous results. All stores should be plainly labeled.

CARE AND UTILIZATION OF FATS.

Fats that are derived from the cooking of bacon, ham, chicken, beef, and other meats, should be kept, each in its own receptacle, to be used for different purposes.

Home rendering of both suet and leaf lard has its advantages, because the product is generally superior to what can be bought for the same price.

Both suet and leaf lard require cooking in order to loosen the fat from the tougher membrane that holds it. For this purpose the material is cut in small pieces and covered with water and allowed to cook slowly for some time until no more water remains and the scrap has turned to a light brown.

A better method for suet is that used by German housewives, who economize on butter by the use of beef fat more than do American housekeepers. The suet is cut in small pieces and covered with water, in which it is allowed to soak for a day, the water being changed once in the time. It is then drained and put into an iron kettle with one-half teacup of skim milk to every pound of the suet. It should be cooked very slowly until the sound of boiling entirely ceases. When it has partly cooled, it should be carefully poured off. This fat has no unpleasant taste or odor, and in many recipes may be substituted for part of the butter. Some cooks add a pound of leaf lard to 4 or 5 of the suet; this makes a softer fat, as lard has a lower melting point than beef fat.

An old-fashioned method of clarifying fat from the soup kettle, or from cooked meats, so that it may be used in the kitchen, is to add the cold fat to a liberal quantity of cold water, then heat slowly and let cook for an hour or more. When cold, the cake of fat is removed and the lower portion, which will contain the small particles of meat, etc., should be scraped away and the white, clean fat saved. If the flavor or color or both are not satisfactory the process may be repeated several times. Another method which is often recommended is to cook a number of slices of raw potato in the boiling fat.

When an ice chest is used fat in small quantities may be easily kept sweet for cooking purposes. If lard is rendered at home in quantity sufficient for a long time, it should be kept covered in tins or earthen jars, in a cool, dry place, as in a cellar or storeroom.

In some families where fat from cooked meats is not used in the kitchen it is made into soap for laundry or even toilet use. Directions for making soap at home may be found in most good books on housekeeping. Some questions concerned with soap making at home are considered in a discussion of laundry and other cleaning problems by Miss Rose,^a of the Home Economics Department of the Agricultural College at Cornell University.

Cooking butter may be bought at a lower price than table butter, but it should be rendered before using. It may be found to have some degree of rancidity, and to correct this condition there must be mixed with it one-fourth to 1 teaspoonful of baking soda to the pound. It should be melted and cooked down slowly until the froth rises and the sound of cooking ceases, then skimmed and poured off carefully from the dregs. Unless to be used immediately, one-half tablespoonful of salt per pound should be added. One-third less of this clarified butter is equivalent to the quantity of ordinary butter called for in any recipe. In India and some other tropical countries this rendered butter, called "ghee" or some other special name, is a product much used by the native population, and through their example by others, who have found by long experience that butter will keep in good condition in this form while it would generally spoil if stored as made.

HANDLING OF FOOD AND UTENSILS IN THE KITCHEN.

The handling of food before it reaches the home is a matter of the greatest importance to the housekeeper, as it has a very important relation to the condition of the food and to its keeping qualities, wholesomeness, and other characteristics after it is purchased.

In preceding sections it has been shown what are the dangers from market dirt and dust, from flies and other animal life, from the soiled hands and garments and utensils of butcher and grocer, milkman, and delivery boy. It is not too much to say that when the food reaches our door much of it is an object of suspicion, and this will be the case until market inspection is far better than at present. But we have now to consider what treatment shall be given to perishable food when it comes into the kitchen.

MEATS.

The dealer must be especially enjoined to tie up the meat in a secure package, else the brown paper in which it is loosely wrapped will not protect it thoroughly in transit. This paper should not go with the meat into the ice box.

^a The Laundry: Cornell Reading Courses for Farmers' Wives, n. s. 1, Sanitation, 1909, No. 3.

When meat is received the skin side should be rubbed with a cloth wet in hot water and then carefully scraped with a knife. The thin outer skin of lamb should be entirely removed in order to avoid the disagreeable taste due to any contact with the hair of the animal. The cut surface should also be carefully scraped, and, to prevent drying, be covered with paraffin paper or rubbed with salad oil, or, in case the meat is to be kept for some time, entirely covered with melted suet. The meat should then be put on a plate in the ice box.

POULTRY.

The skin of poultry is frequently very dirty when brought from market and fowls should be not only washed, but scrubbed with a soft brush and warm water in which a teaspoonful of baking soda has been dissolved. Such treatment will prevent the disagreeable "henney" taste often noticeable in cooked poultry.

Poultry should be drawn immediately, and unless it is known to have been killed very recently it should be thoroughly washed on the inside and used soon. Poultry that is drawn directly after killing, on the contrary, keeps better if it is not washed until used. (See also p. 23.) It should be hung in a cold place or put in the ice box with a piece of charcoal inside the body.

Cold-storage chickens should under no circumstances remain in a warm room before cooking. Such poultry must be kept at a low temperature and cooked as soon as possible. All cold-storage food when brought into a warm temperature spoils quickly, and without doubt many cases of illness traced to the use of such food are really due to careless handling and delay in cooking.

WASHING VEGETABLES.

If deteriorated vegetables are brought into the kitchen no method of handling will restore them to first-class condition. Even good ones will not be at their best unless they are properly cared for after being received. After all that has been said in this bulletin regarding the possibilities of dangerous micro-organisms having lodged upon vegetables, it may seem superfluous to insist again that any which are to be eaten raw should be thoroughly washed. It is of course useless to wash them with water which is itself dangerous, and in any case where the water supply is not considered safe for drinking, boiled water should be used for washing vegetables and fruit after the first rough dirt has been removed by hydrant water.

As to the method of washing vegetables, a few cautions are in order. Some people never choose asparagus at table unless it has been prepared by some one who is very careful, as they do not wish to bite down on sand, for the cleaning of this vegetable requires con-

science as well as care. The bunch should be placed, heads down, in water for some hours and should be shaken back and forth to dislodge the particles of earth. Spinach is another vegetable which requires the best cleansing to free it from grit. After the roots have been cut off it should be washed in a number of waters and lifted out of the pan each time in loose handfuls before the water has been drained off.

Celery and lettuce and other salad plants, because eaten raw, must be washed with the greatest care. They should be searched leaf by leaf for insect life, washed in several waters, and then wiped dry with a clean cloth and put in a cold place to become crisp.

WASHING FRUITS.

A German investigator, B. Ehrlich,^a having estimated by careful experiments the number of bacteria to be found on market fruit, tried different methods of washing it without injuring the flavor. He washed grapes, apples, and pears that had been exposed to street dust, each time examining the wash water for the number of bacteria present. While the first wash water yielded large numbers, the second contained only a few, and the third a negligible number. A basin of water was used for the purpose, the fruit being moved about in it. When running water was used, five minutes' time was allowed. Fruits with a firm, smooth skin should be rubbed before washing with a clean cloth to start the dirt.

The cleaning of delicate berries is a difficult matter. Such fruit should be purchased with care to avoid all that are too soft or which show sand or other visible dirt. Strawberries, because they grow so near the ground, should not be purchased after a rain, which will spatter them with muddy drops. Only the freshest and cleanest berries should be served raw; more doubtful specimens should be cooked. By immersing them in water a few at a time and handling carefully, such fruits may be washed without much loss of flavor. These matters are also discussed in an earlier bulletin ^b of this series.

Dried figs and dates are very commonly eaten without cooking, or even washing, and yet they have been exposed for an unknown length of time to the contagion brought by dust, flies, and dirty hands. In how many houses are oranges washed before they are brought to the table, or the lemon before it is sliced for the tea or lemonade, or before the skin is grated for flavoring? Yet the skin is often very dirty.

Shelled nuts purchased in market should always be washed and scalded before they are used, as they are commonly exposed to dust,

^a Arch. Hyg., 41 (1901), p. 152.

^b U. S. Dept. Agr., Farmers' Bul. 293.

and perhaps to flies. They can afterwards be dried on a clean cloth before using.

Many careful housewives wash nuts in the shell before cracking, as this prevents accidental soiling of the kernels.

WASHING EGGS.

The ordinary way to break an egg is to hit it against another egg or over the edge of the mixing bowl and let the contents stream over the side of the shell without considering whether the latter is clean or not. Even if there is no visible dirt, the shell may not be as clean as it seems, for it may have come from a dirty nest or have been untidily handled. Eggs should therefore always be washed before breaking.

DISHWASHING.

The bacteriologist finds no kitchen clean enough and the ordinary methods of washing dishes he is likely to call a "smear."

Dishes have been tested to determine the number of organisms that remain on them after "ordinary" washing as compared with a method that requires an application of hot water with the help of soap or, better still, carbonate of soda, a thorough rinsing in hot water, and wiping with a sterilized cloth (that is, one which has been in boiling water since it was used before). By this latter method the dishes were practically sterile while many organisms were left on the dishes that were washed by the "ordinary" method.

One might ask what harm will they do if present. Oftentimes none, but if the bacteria are those which convey disease, dirty dishes may be the means of giving it to well persons. But most of all, persons who are at all thoughtful of such things do not want any dirt which may be prevented by good methods, simply because dirt in itself is sufficiently unpleasant.

In washing milk utensils it is first necessary to remove with warm water all traces of the milk before scalding water is used. Because of the cream adhering to the sides soap is used also, but the greatest care must be taken to remove by repeated rinsing every trace of soap. A telltale flavor of soap in the morning cream has more than once revealed careless habits in the kitchen, and made it evident that all the soap was not removed in rinsing. The utensils must then be dipped into absolutely boiling water for a moment.

It is an important matter to wash the milk bottle in which milk is now commonly delivered to customers. By this we refer to the washing of the full bottle before it is opened. It is safe to say that this is seldom done. But notice the bottle as it is brought into the kitchen, the milkman grasping it with his hand over the top. These hands perhaps more often than not have harnessed his horse,

have been grasping the reins all the morning, have opened and shut doors, run along stair railings, have perhaps wiped mouth or nose, and yet the thoughtless housekeeper or cook, regarding the white cap as full security from the outer world, pours out the milk over a very dirty bottle brim. Milk bottles should be put under the hot water spigot for a moment and wiped dry with a clean cloth before opening. Most housewives agree that milk bottles should be carefully rinsed before they are returned, perhaps more from a feeling for cleanliness than for absolute necessity, as the milk bottles in all well-managed dairies are thoroughly scrubbed and washed before refilling. If such violations of this practice as recently came under observation are noted, when the driver of a dairy wagon washed out some milk bottles in a public drinking fountain provided for horses, refilled them, and disposed of them to other customers, complaint should be made to the dairy, and if this is not sufficient, to the board of health.

CARE OF THE WATER COOLER.

Water is an indispensable food adjunct and so may be properly spoken of here. The water and the ice supply should both be above suspicion. The question of wells, water, and ice supply has been discussed in earlier bulletins of this series.^a The greatest care should be taken to keep clean and in good condition all vessels in which water is used for household purposes. Water coolers, if used, should be of some material like porcelain or enameled ware which is easily kept clean. They should be scalded out at frequent intervals. The ice, if it comes in contact with the water, should be of known quality. If such ice can not be secured, a water cooler should be used in which the ice is in a separate receptacle and does not come in contact with the water. Many families cool drinking water by putting it in the ice box in glass fruit jars or bottles. Perfect clearness is an indication of purity in ice. Cloudy ice full of bubbles or snow ice should not be used in direct contact with food, and ice which contains dirt of various kinds frozen in it should be regarded with suspicion.

If it is believed that the water is not pure, it may be boiled or filtered, or both. If filters are used, every precaution should be taken to keep them clean and in good condition and to rely only on such as really purify the water. Earthenware filters may be sterilized by placing in a pan or kettle of water and boiling them out after they have been thoroughly scrubbed with a brush. A small piece of wood should be placed under the jar to prevent direct contact with the bottom of the pan.

The water cooler in public places should always be in charge of a responsible person who will keep it clean and in good condition.

^a U. S. Dept. Agr., Farmers' Buls. 43, 73, 262, 309.

Some sort of a sanitary drinking fountain is desirable. The public drinking cup of the sort usually seen should not be permitted. It is uncleanly and furnishes a ready means of transmitting disease.

Recent experiments made by the Kansas State Board of Health^a give results which are in accord with the work of other investigators and plainly showed the presence of mouth bacteria and other micro-organisms, including those which cause pneumonia, on drinking cups from an office building, a ward school, and a railroad station. This means that the user of the public drinking cup runs the risk of taking into his mouth more or less of the saliva of some other person and may take with it micro-organisms causing virulent disease as well as the ordinary mouth bacteria which are doubtless harmless. These unpleasant and dangerous features may be avoided by the use of proper drinking fountains and cups.

In many homes a glass or cup is placed by the water pail or water cooler and is used by all the members of the family. Such a custom should not be followed. Although it is necessarily less dangerous than the public drinking cup, it is not a cleanly practice and is many times without doubt responsible for the spread of colds and other minor ailments throughout a family.

PERSONAL CLEANLINESS IN THE KITCHEN.

There may sometimes be observed in the cooked dish a loss of flavor, not a bad taste, but a lack of what is appetizing. It would be interesting to know in how many cases this comes from a lack of cleanliness in utensils and methods.

Personal cleanliness is of course essential in the kitchen, and every good housekeeper endeavors to maintain a high standard in such matters. Some food manufactories make special efforts to secure cleanliness and hygienic surroundings, and the good example they set should be generally followed.

"Food and fingers are carriers of contagion." The proper way of washing the hands, if seriously taught and seriously practiced, in the market and in the kitchen, would go far to remove the source not only of infection but of such additions to the food as are disgusting to think of. In this matter some food manufactories are cleaner in their methods than are our kitchens. In one large bakery, where information was collected, the rule is in force that every employee shall wash his hands on returning to the room after leaving it for any purpose whatever.

The running tap, like the shower bath, offers a great improvement over old methods of washing. Few will have patience to fill and refill the hand basin until the hands are bathed at last in clean water,

^a Bul. Kans. Bd. Health, 5 (1909), No. 3, p. 76.

but this result is easily accomplished under the tap. The nailbrush and nail cleaner must have their place in the kitchen, and their use must be insisted on before bread or cake is mixed and after work at all soiling in character.

Every one will admit that there is need for exercising great care in coughing and sneezing wherever such necessary acts may be annoying to others. When one recalls that experiment has shown that a fine spray of saliva may be thrown in all directions for a distance of 4 or 5 feet by a violent sneeze or cough and that often the cause of the cough or sneeze is something which can be thus communicated to others, it is evident that there is abundant reason for caution. Particularly is this essential wherever food is prepared, exposed, or served.

USE OF PAPER IN THE KITCHEN.

Paper has many uses in the kitchen. The cook needs a piece of paper on which to drain the fried croquette or fritter and she reaches out for the brown paper that came around the meat or for the grocer's bag. She turns to the same source when she wishes paper for lining a cake pan. A little reflection will show how far from cleanly is this practice.

In every kitchen should be found a roll of grocer's paper on its frame. You are sure here of something that has not been handled since it was rolled up by machinery in the factory. Paraffin paper should also be at hand for covering food, for wrapping up sandwiches for school lunches, and for similar purposes.

IMPORTANCE OF GOOD HOUSE PLANS AND HOME CONVENIENCES.

The care of food in the home and all other forms of household work are greatly facilitated by right planning and the use of suitable materials for the construction and furnishing of the home. An adequate and convenient water supply and other conveniences are essential, not only for comfort and for saving labor, but also from the standpoint of home hygiene. The question of home conveniences, the arrangement of a kitchen, and similar topics are considered in other bulletins ^a of this series and in many volumes on the house and house construction.^b

^a U. S. Dept. Agr., Farmers' Buls. 270, 317, 342.

^b The Healthful Farmhouse. Boston, 1906. The House, Its Plan, Decoration, and Care. Isabel Bevier. Chicago, 1907.

CLEANLINESS IN PUBLIC EATING PLACES.

The sanitary condition of kitchens and the food service in hotels and other places where food is served to the public is a matter to which most persons who patronize them have given at least occasional thought.

Perhaps the most common attitude toward this subject of the "temporary home," as toward markets and other places where food is handled or prepared before it reaches the home kitchen, is that it is least disturbing to put it out of mind and to forget unpleasant things which, it is assumed, can not be remedied.

This is not the right attitude, for the subject has a direct relation to comfort and to health and is one in which public sentiment is perhaps the chief factor in securing regulation. Legislation regarding the inspection and regulation of hotels, restaurants, and other places where meals are served is in force in some cities and contemplated in others. The results of the inspection of restaurant and lunch-room kitchens in Washington, D. C., by the board of health indicates that the matter is one which needs to be under control, and concerning which the public has a right to full information, so that the clean places may be patronized and the others avoided.

Proper ventilation in hotel and restaurant kitchens, suitable sanitary conveniences for employees, and whatever else makes for clean food are matters of public hygiene which are of the same importance as is the case with bakeries, markets, candy factories, and other places where food is handled.

There are other matters which are also worth considering in this connection.

It is no very uncommon thing to notice in a hotel, restaurant, or dining car, and often in those which pride themselves on the excellence of their service, practices which would not be permitted if due attention was paid to all matters of hygiene. For instance, it may be sometimes noted that finger bowls which have not been washed since a previous service are placed before guests. Soiled napkins may also be seen occasionally in use for wiping off table dishes before service. It is certain that such practices where they exist would not continue if supervision by the management was as thorough as it should be or if patrons were not indifferent to them or lacking in observation.

The public owes a duty to the management in such matters and all such violations of the laws of hygiene and cleanliness should be reported to the proper person. Here, as in most other instances, the remedy lies in the hands of the public.

On the other hand, there is no ground for a general suspicion of the methods in use in hotels and restaurants. Probably in the majority of cases a great deal of attention is given to kitchen and serving-room equipment, which is designed as regards both material and method of construction in such a way that it may be readily kept clean, and good hotels and restaurants are constantly endeavoring to make sure that food is handled, cooked, and served in a cleanly manner. In general, carefully managed hotels welcome inspection of their kitchens and storerooms by visitors.

In conclusion it may be said that the preparation of food must more and more come to be considered as an occupation that requires of the person who undertakes it knowledge and habits quite beyond what is now expected of a person who is simply a "good cook."

It is even more essential that the housewife who buys food and who attends to her own food preparation should have such knowledge.

FARMERS' BULLETINS.

Bulletins in this list will be sent free, so long as the supply lasts, to any resident of the United States, on application to his **Senator, Representative, or Delegate in Congress**, or to the Secretary of Agriculture, Washington, D. C. Because of the limited supply, applicants are urged to select only a few numbers, choosing those which are of special interest to them. Residents of foreign countries should apply to the Superintendent of Documents, Government Printing Office, Washington, D. C., who has these bulletins for sale. Price 5 cents each to Canada, Cuba, and Mexico; 6 cents to other foreign countries. The bulletins entitled "Experiment Station Work" give briefly the results of experiments performed by the State experiment stations.

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27. Flax for Seed and Fiber.
28. Weeds: And How to Kill Them.
30. Grape Diseases on the Pacific Coast.
32. Silos and Silage.
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36. Cotton Seed and Its Products.
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